

**Abstract**

A nitride semiconductor device used chiefly as an LD and an LED element. In order to improve the output and to decrease  $V_f$ , the device is given either a three-layer structure in which a 5 nitride semiconductor layer doped with n-type impurities serving as an n-type contact layer where an n-electrode is formed is sandwiched between undoped nitride semiconductor layers; or a superlattice structure of nitride. The n-type contact layer has a carrier concentration exceeding  $3 \times 10^{18} \text{ cm}^{-3}$ , and the resistivity 10 can be lowered below  $8 \times 10^{-3} \Omega\text{cm}$ .

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